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Monthly Statistical Report

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SUMMARY

Residual fuel oil's continuing year-to-year declines partially offset third quarter increases for gasoline, distillates, and kerosine jet fuel, holding the quarter's total deliveries to a level only 0.7 percent higher than one year earlier. Excluding residual fuel oil, however, the increase for the remaining products amounted to 1.4 percent—slightly stronger than the second quarter's 0.7 percent rise for this group of products.

These figures include gasoline deliveries, which, though rising 1.2 percent for September, averaged only 0.3 percent higher for the quarter—still in disagreement with travel growth, which has continued at a steady 3.6 percent rate so far this year. For distillate, postponed buying by affected off-highway users as a result of pending excise tax legislation helped to pull distillate deliveries down for much of September. Nevertheless, despite nearly flat results for the month, quarterly growth still amounted to 3.1 percent.

Threatened by hurricanes Florence and Gilbert, offshore production in the Gulf was shut down for several days during the month as several thousand workers were evacuated. As a result, domestic crude oil production, already on a downtrend since the oil price collapse of 1986, slipped below 8 million B/D for the first time in more than a decade.

The tropical storms also temporarily hindered petroleum shipments into the Gulf Coast, though imports for September as a whole still roughly matched the 6.9 million B/D average of the first nine months. Though shipments from the Persian Gulf now account for a fifth of U.S. imports, they have supplied more than half of the roughly 2 million B/D increase in imports over the past three years; worldwide, almost all the increase in non-communist crude oil production has come from this region.

Despite precautionary shutdowns in parts of the Gulf Coast due to the hurricanes, refinery input for September rose 1.5 percent over a year ago. Increasingly uncertain world markets led to a 5 million barrel decline in total inventories, in contrast to an average seasonal increase of about 17 million barrels. Crude stocks fell for the third month in a row, reaching the lowest level in more than a year. Distillate stocks, however, rose in line with normal increases for the season to a level 3 million barrels higher than a year ago.

PRODUCT SUPPLIED[1/]

Gasoline

DELIVERIES STILL LAG BEHIND TRAVEL. Gasoline deliveries continued to diverge from other indicators of demand during the third quarter. September's 1.2 percent increase, when combined with mixed results for the previous two months, yielded only a marginal increase for the quarter as a whole. The slowing in deliveries growth rates over the past three quarters—from 3.2 percent in the first quarter to 0.8 percent in the second and 0.3 percent in the third—contrasts with data on miles traveled. Travel has shown steady gains of 3.6 percent for both the first and second quarters, rising slightly to 3.7 percent for July, the most recent month available.

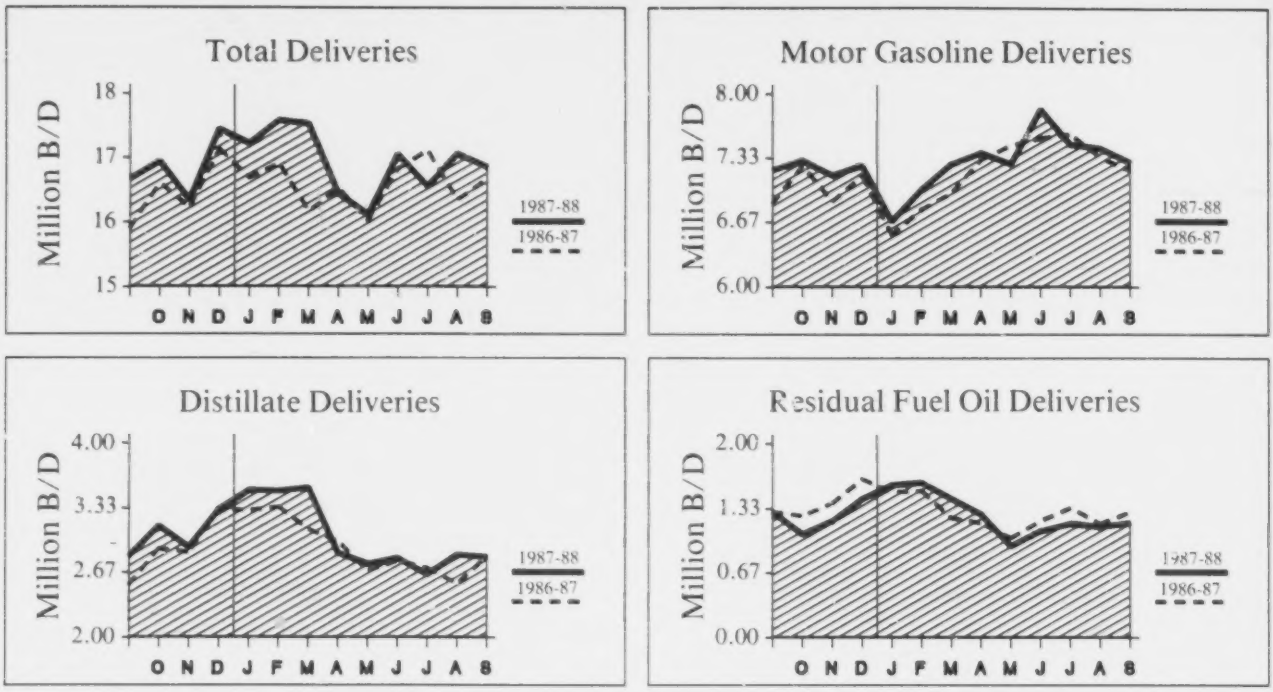
For the first time ever, sales of premium unleaded are now surpassing those of leaded regular. Leaded's market share, falling at a rate of 6 percentage points from a year ago, now accounts for only 17 percent of the market—a drop of almost 30 percentage points in the past five years. Premium unleaded's share has climbed to over 23 percent, up about 3 percentage points over a year ago, according to Department of Energy data. This represents a continuation of last year's slightly higher market penetration rate; in the two years prior to 1987, premium unleaded's share had grown by only 1 or 2 percentage points per year. The remainder of leaded's loss has translated into gains for unleaded regular and midgrade.

Distillates

FLAT FOR SEPTEMBER BUT UP FOR THE THIRD QUARTER. Though declining slightly for September, distillate deliveries for the quarter as a whole were still up 3.1 percent compared with a year ago. September's weak performance is likely attributable in part to the effects of a potential change in Federal excise tax collection which had been expected by many to be enacted by the end of the month. Though at the last minute, Congressional action was delayed, the change

API ESTIMATES

	SEPTEMBER		YEAR-TO-DATE	
	Million B/D	Percent Change	Million B/D	Percent Change
Total domestic deliveries	16.9	1.1	16.9	2.1
Crude oil production[2/]	7.9	(3.3)	8.2	(2.3)
Total imports[3/]	6.9	(3.0)	6.9	6.8
Stocks (million bbl)[3/]	1,064	(0.7)	na	na



would have meant that, effective October 1, affected off-highway users would no longer have had to pay the excise tax up front and then apply for a refund. Until it became clear that the bill's passage was delayed, this may have led many such users to postpone September purchases until later in the year.

The change in tax law would have been a reversal of the one which took place last April 1, when most exempt and off-highway users lost the ability to purchase diesel fuel tax-free. At that time, too, the change was apparent in deliveries data; March deliveries had jumped nearly 14 percent over the previous March, while deliveries the following month were off 4 percent.

Residual Fuel Oil

LOWER DELIVERIES CONTINUE. Deliveries of residual fuel oil are estimated to be 1,186 thousand B/D, representing an increase of 3.5 percent from last month but a decline of 8.5 percent from a year ago. Although the most recent estimate indicates a slight firming of demand for the product, it still reflects the fundamental weakness seen during the past several months. As a result, deliveries for the third quarter are estimated to be 1,167 thousand B/D, a decline of 103 thousand B/D, or 8.1 percent, from last year's levels.

The utility and industrial sectors are believed to have contributed to the weakness in demand. Electric utilities, having been one of the more positive influences in previous months due to the abnormally warm weather, are reported to have decreased deliveries as a result of the return to more normal climatic conditions. Heavy fuel oil's recent favorable price advantage over natural gas, however, apparently encouraged several utility and industrial customers to begin to increase their purchases of heavy fuel oil towards the end of the month.

Bunker fuel markets also continue to remain weak in all regions of the country. Spot purchases of bunker fuel, especially on the East and Gulf Coasts, have apparently been discouraged due to the fear of possible further price weakness, and only minimum contract volumes are being delivered. Moreover, a price advantage for Rotterdam bunkers, which had already been displacing East Coast sources, is reportedly beginning to have the same dampening effect on Gulf Coast deliveries. Deliveries, however, were reportedly beginning to stabilize by the end of the month, albeit at low levels.

Kerosine Jet Fuel

LESS GROWTH IN DOMESTIC TRAVEL SLOWS DELIVERIES. Kerosine jet fuel deliveries' smaller increase for the third quarter mirrors the slower growth in air traffic of recent months. With the inclusion of September's 5.1 percent increase, deliveries for the quarter as a whole still rose only 2.4 percent, contrasting with 6.9 percent in the first quarter and 3.9 percent in the second. Last year's annual increase had been nearly 7 percent.

Air traffic growth continued at a lower rate in the third quarter, estimated to be similar to the second quarter's rise of about 3 percent and down from last year's 8 percent increase. Higher fares have dampened domestic traffic growth, though the lower dollar has kept the smaller volume of international traffic growing at about a 13 percent rate in recent months.

Other Oils

DELIVERIES FOR THE QUARTER MATCH LAST YEAR'S. Deliveries of other oils are estimated to be 4,336 thousand B/D, representing and increase of 0.7 percent from last year. For the third quarter, however, other oils deliveries

were estimated at 4,226 thousand B/D, even with levels of a year ago as a result of moderation in petrochemical feedstock deliveries earlier in the quarter.

Deliveries of feedstocks, however, are believed to have firmed up in the most recent month. Olefin plants were reported to have been operated at close to their rated capacities. Propane deliveries, having borne much of the earlier weakness, have apparently regained much of their lost market share as a result of continuing robust demand for ethylene feedstocks as a whole. Purity ethane, the most preferred feedstock, continues to experience apparent strong deliveries due to its high ethylene product value and lack of less valued co-products. Reversing an apparent downward trend, butanes are also reportedly experiencing small but measurable increases in deliveries. In anticipation of new vapor-pressure regulations for gasoline, several petrochemical plants are reportedly experimenting with butanes as an alternative ethylene feedstock. At the heavier end, naphtha and gasoil are reportedly maintaining their market share of the feedstock market.

Asphalt and road oil deliveries were also reported to have contributed to the strength in deliveries in this category. Several states, still recovering from late-summer weakness, are reported to have sustained high levels of activity in their road building and maintenance programs which were held up as a result of earlier delays in adopting new budgets. Refinery gas deliveries, however, are apparently slightly lower than last month as a result of seasonal declines in motor gasoline production.

SUPPLY[1/]

Production

OFFSHORE, FLORENCE AND GILBERT HINDER OPERATIONS. Domestic crude oil production, which has been heading downward since the 1986 oil price collapse, fell below 8 million B/D for the first time in more than a decade as hurricanes hampered offshore production in the Gulf of Mexico. September's production, estimated at 7,938 thousand B/D, declined nearly 270 thousand B/D from a year ago, with output in the lower 48 falling by over 400 thousand B/D.

The storms are estimated to have cut domestic production by more than 100 thousand B/D for the month as precautionary moves against hurricanes Florence and Gilbert—the latter the most powerful hurricane to threaten the region this century—led to the shutting in of production platforms for several days while thousands of workers were evacuated. Fortunately, the storms caused little damage to offshore facilities in the Gulf.

Though the effects of the hurricanes on domestic production were temporary, the lower crude oil prices of the past two and a half years, especially with the weakening that has taken place in the past several months, have had more long-lasting effects on upstream activity. Despite substantially lower drilling costs—recently-released data from the *Joint Association Survey* show a 25 percent decline in cost per foot from 1985 to 1987, once adjusted for changes in regions and depth categories—drilling activity has remained depressed. Third quarter completions are estimated to be down 12 percent from a year ago and over 50 percent from the same quarter in 1985.

Imports

DESPITE DELAYS, SEPTEMBER IMPORTS MATCH YEAR TO DATE. Despite temporary shipping delays on the Gulf Coast caused by the hurricanes, imports for the month continued at 6.9 million barrels per day, similar to the year-to-date average. Though down about 5 percent in the third quarter from 1987's recent-year quarterly record of 7.3 million B/D, for the first nine months as a whole, imports are up about 440 thousand B/D or 6.8 percent.

Shipments from the Persian Gulf have been running at about 1.4 million B/D so far this year, about one fifth of all U.S. oil imports. On an incremental basis, however, imports from this region have accounted for more than half of the roughly 2 million B/D jump in imports over the past three years. Perhaps even more important than its place in the mix of U.S. imports sources is the role of this region in world markets, since U.S. importers, in fact, must compete with the rest of the world's petroleum importers for supplies. The incremental role of Persian Gulf oil in U.S. import figures actually understates the situation worldwide; nearly all of the increase in non-communist crude oil production over this period has come from the Persian Gulf.

Imports of motor gasoline and blending components subsided from August's record level, but at over 470 thousand B/D, where still relatively strong compared with imports for the same month in previous years. Distillate imports were within the range of recent experience for September, averaging about 270 thousand B/D. Residual fuel oil imports, which had dropped to less than 400 thousand B/D in June in re-

sponse to unfavorable price comparisons with domestic sources, have been recovering in recent months despite continued weakness in deliveries. September's imports rose to nearly 600 thousand B/D, up about 70 thousand B/D from a year ago and the highest monthly level since March.

Refinery Operations

INPUT RISES 1.5 PERCENT OVER LAST SEPTEMBER.

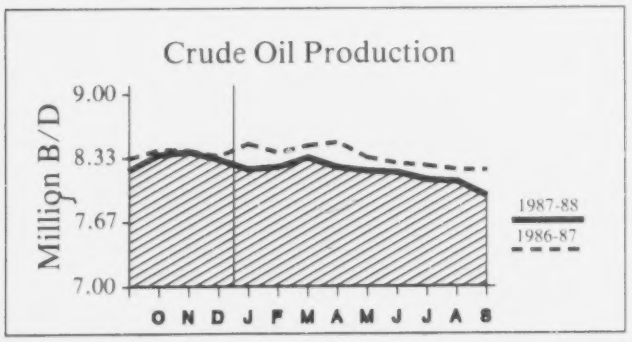
With the seasonal slackening of refinery activity from its summer peak, input to distillation units declined from a recent-year record in August of over 14 million B/D to 13.5 million B/D in September as the opportunity arose to undertake turnarounds and gear up for the coming heating season. September's input to distillation units, though following the traditional pattern of an August-September decline, still exceeded that of last September by 1.5 percent. This was despite temporary cutbacks in some areas of the Gulf Coast in response to hurricane Gilbert. As it turned out, the storm caused little if any damage to facilities.

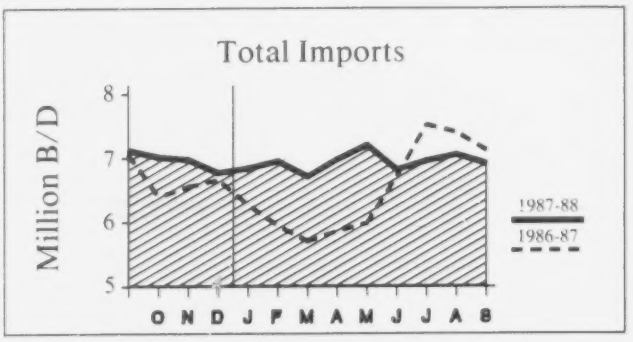
Refinery production for September roughly reflected deliveries trends of the past several months, with gasoline production up about 1 percent over last September and distillate output up about 3 percent.

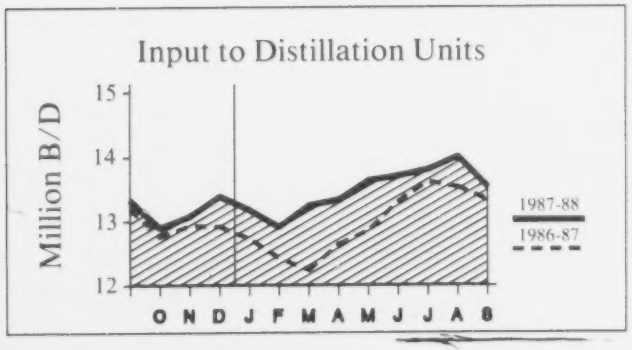
Inventories

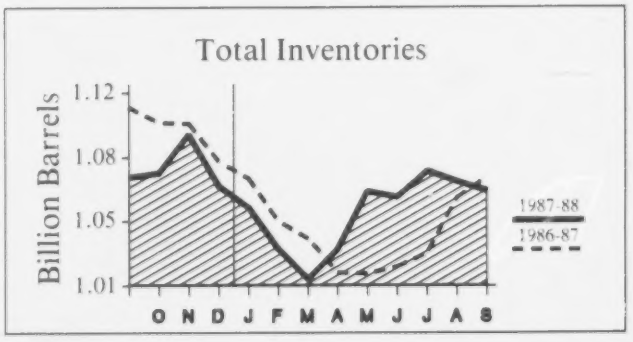
CONTRARY TO SEASONAL NORM, STOCKS FALL.

Total stocks fell 5 million barrels during September—in contrast with an average seasonal increase of about 17 million barrels—as increasingly uncertain world markets added to the risks of holding surplus inventories. Crude oil inventories fell for the third month in a row to 324 million barrels, the lowest level in more than a year. Distillate stocks, however, rose 7 million barrels, about average for the month; at month-end, distillate inventories stood at 130 million barrels, 3 million barrels higher than one year earlier.









1/ Total supply, i.e., production plus imports adjusted for net stock change is equal to total products supplied from primary storage. Total products supplied from primary storage less exports is equal to total domestic products supplied. Information contained in this report is derived from information published in the API Weekly Bulletin and is based on historical analysis of the industry. All data reflect the most current information available to the API and include all previously published revisions.

2/ Includes lease condensate.

3/ API data do not include crude oil imported for the Strategic Petroleum Reserve (SPR) nor crude oil stocks held in the SPR (according to the U.S. Department of Energy, the SPR held approximately 554 million barrels as of September 30, 1988).

ESTIMATED UNITED STATES PETROLEUM BALANCE

(Daily Average in Thousands of 42 Gallon Barrels)

Products Supplied/Supply From Primary Storage	SEPTEMBER			YEAR-TO-DATE		
	1988[1]	1987[2]	% Change	1988[3R]	1987[2]	% Change
Products Supplied:						
Total motor gasoline	7,289	7,205	1.2	7,292	7,195	1.4
Finished leaded motor gasoline*	1,242	1,669	(25.6)	1,380	1,785	(22.7)
Finished unleaded motor gasoline*	6,047	5,536	9.2	5,912	5,410	9.3
Naphtha-jet	212	221	(4.1)	212	206	2.9
Kerosine-jet	1,197	1,139	5.1	1,215	1,164	4.4
Distillate fuel oil	2,832	2,838	(0.2)	3,040	2,923	4.0
Residual fuel oil	1,186	1,296	(8.5)	1,269	1,274	(0.4)
All other oils[4]	4,336	4,306	0.7	4,080	4,046	0.8
Reclassified[5]	- 193	- 335	(42.4)	- 175	- 227	(22.9)
Total domestic products supplied	16,859	16,670	1.1	16,933	16,581	2.1
Exports	885	795	11.3	848	747	13.5
Total products supplied	17,744	17,465	1.6	17,781	17,328	2.6
Supply:						
Domestic production:						
Crude oil[6]	7,938	8,205	(3.3)	8,155	8,346	(2.3)
Natural gas liquids	1,614	1,582	2.0	1,606	1,587	1.2
Other supply[7]	1,110	957	16.0	1,070	861	24.3
Total domestic supply	10,662	10,744	(0.8)	10,831	10,794	0.3
Imports:						
Crude oil, total 10/	4,964	5,047	(1.6)	4,932	4,515	9.2
Canadian	614	609	0.8	676	611	10.6
Other	4,350	4,438	(2.0)	4,256	3,904	9.0
Products, total	1,941	2,068	(6.1)	2,008	1,986	1.1
Residual fuel oil	595	526	13.1	543	572	(5.1)
Other	1,346	1,542	(12.7)	1,465	1,414	3.6
Total imports	6,905	7,115	(3.0)	6,940	6,501	6.8
Total supply	17,567	17,859	(1.6)	17,771	17,295	2.8
Stock change, all oils	- 177	+ 394	XXXX	- 10	- 33	XXXX
Refinery Operations						
Input to crude oil distillation units	13,531	13,328	1.5	13,483	12,964	4.0
Operable capacity	15,917	15,593	2.1	15,905	15,587	2.0
Refinery utilization (%)[8]	85.0%	85.5%	(0.6)	84.8%	83.2%	1.9
Crude oil runs	13,400	13,168	1.8	13,320	12,813	4.0

Stocks (millions bbls.)	1988		1987[2]	% Change from ...	
	Sep. 30[9]	Aug. 31[9]	Sep. 30	Previous Month	Year Ago
Crude oil 10/	324.0	332.4r/	337.2	(2.5)	(3.9)
Unfinished oils	108.2	111.4r/	103.0	(2.9)	5.1
Total motor gasoline**	221.3	217.5r/	229.6	1.8	(3.6)
Finished leaded motor gasoline*	41.5	43.0	55.0	(3.5)	(24.6)
Finished unleaded motor gasoline*	141.3	137.7r/	136.2	2.6	3.7
Naphtha-jet	6.6	7.0	6.5	(5.7)	1.5
Kerosine-jet	41.5	40.5r/	43.7	2.5	(5.0)
Distillate fuel oil	129.9	123.0r/	126.8	5.6	2.4
Residual fuel oil	44.3	38.8	44.4	14.2	(0.2)
All other oils	188.3	198.8r/	180.6	(5.3)	4.3
Total all oils	1,064.1	1,069.4r/	1,071.8	(0.5)	(0.7)

1/ Based on API estimated data converted to a monthly basis.
2/ Source: U.S. Department of Energy.
3/ Source: January-July, U.S. Department of Energy, August-September, API.
4/ Includes crude losses.
5/ Beginning with January 1981, U.S. Department of Energy began using a new data collection system which encompasses a method to ascertain the amount of product reclassified during the production phase. So that there will be no double counting of these volumes, they are subtracted from total domestic products supplied.
6/ Includes lease condensate.
7/ Includes Unaccounted-for crude oil, Refinery input of other hydrocarbons, and Processing gain.
8/ Represents "Input to crude oil distillation units" as a percent of "Operable capacity."
9/ Derived by interpolating API weekly stocks data.
10/ Data do not include oil imported for the Strategic Petroleum Reserve (SPR) nor crude oil stocks held in the SPR.
R/ Revised.
* Included in motor gasoline.
** Includes finished leaded, finished unleaded, and motor gasoline blending components stocks.

ESTIMATED UNITED STATES PETROLEUM BALANCE

(Daily Average in Thousands of 42 Gallon Barrels)

Products Supplied/Supply From Primary Storage	3rd QUARTER		
	1988[1]	1987[2]	% Change
Products Supplied:			
Total motor gasoline	7,397	7,377	0.3
Finished leaded motor gasoline*	1,302	1,731	(24.8)
Finished unleaded motor gasoline*	6,095	5,646	8.0
Naphtha-jet	215	221	(2.7)
Kerosine-jet	1,196	1,168	2.4
Distillate fuel oil	2,784	2,700	3.1
Residual fuel oil	1,167	1,270	(8.1)
All other oils[3]	4,226	4,225	0.0
Reclassified[4]	- 160	- 251	(36.3)
Total domestic products supplied	16,825	16,710	0.7
Exports	864	712	21.4
Total products supplied	17,689	17,422	1.5
Supply:			
Domestic production:			
Crude oil[5]	8,045	8,222	(2.2)
Natural gas liquids	1,608	1,578	1.9
Other supply[6]	1,077	836	28.8
Total domestic supply	10,730	10,636	0.9
Imports:			
Crude oil, total [9/]	5,057	5,239	(3.5)
Canadian	653	632	3.3
Other	4,404	4,607	(4.4)
Products, total	1,940	2,102	(7.7)
Residual fuel oil	498	587	(15.2)
Other	1,442	1,515	(4.8)
Total imports	6,997	7,341	(4.7)
Total supply	17,727	17,977	(1.4)
Stock change, all oils	+ 38	+ 555	XXXX
Refinery Operations			
Input to crude oil distillation units	13,780	13,491	2.1
Operable capacity	15,929	15,631	1.9
Refinery utilization (%)[7]	86.5%	86.3%	0.2
Crude oil runs	13,641	13,328	2.3

Stocks (millions bbls.)	3rd QUARTER		
	1988[8]	1987[2]	% Change
Crude oil [9/]	324.0	337.2	(3.9)
Unfinished oils	108.2	103.0	5.1
Total motor gasoline**	221.3	229.6	(3.6)
Finished leaded motor gasoline*	41.5	55.0	(24.6)
Finished unleaded motor gasoline*	141.3	136.2	3.7
Naphtha-jet	6.6	6.5	1.5
Kerosine-jet	41.5	43.7	(5.0)
Distillate fuel oil	129.9	126.8	2.4
Residual fuel oil	44.3	44.4	(0.2)
All other oils	188.3	180.6	4.3
Total all oils	1,064.1	1,071.8	(0.7)

1/ Source: U.S. Department of Energy, July; August-September, API.
2/ Source: U.S. Department of Energy.
3/ Includes crude losses.
4/ – Beginning with January 1981, U.S. Department of Energy began using a new data collection system which encompasses a method to ascertain the amount of product reclassified during the production phase. So that there will be no double counting of these volumes, they are subtracted from total domestic products supplied.
5/ Includes lease condensate.
6/ Includes Unaccounted-for crude oil, Refinery input of other hydrocarbons, and Processing gain.
7/ Represents "Input to crude oil distillation units" as a percent of "Operable capacity."
8/ Derived by interpolating API weekly stocks data.
9/ Data do not include oil imported for the Strategic Petroleum Reserve (SPR) nor crude oil stocks held in the SPR.
* Included in motor gasoline.
** Includes finished leaded, finished unleaded, and motor gasoline blending components stocks.

ASSESSING UNDERLYING TRENDS IN PETROLEUM DATA

The Variable Nature of Deliveries Data

We have found a need for ways to assess underlying trends in petroleum consumption because of the often-volatile nature of deliveries data. This volatility has been well-evident this year; the year-to-year change in total deliveries, for example, began 1988 with a 3.2 percent increase in January, rising to 8.4 percent in March, and then dropping precipitously to a 0.5 percent decline in April; similar swings have continued in more recent months. As petroleum analysts know, it is highly unlikely that substantial swings such as these correspond with dramatic changes in consumption. Thus, in our analysis at API we find there is a need for various techniques to get below the surface of the data in order to better understand what is really happening.

The reasons deliveries data differ from underlying consumption trends include:

1) Deliveries data measure only the disappearance from primary storage, and thus do not take into account movements in nonprimary inventories such as those held by distributors or end users—movements which have frequently been significant.

2) Unusual or short-term events, such as unusually cold winter weather, can temporarily affect consumption but have little long-term significance; these deviations in consumption tend to be reflected in deliveries as well.

3) Discrepancies between estimated consumption trends and deliveries data sometimes point to difficulties with the data arising from such factors as missing respondents or a need for additional collection methods.

Thus, in seeking a broader picture of where petroleum consumption has been going, we have found that the raw deliveries data alone may as frequently obscure developments as they elucidate them. Knowledge of underlying trends and market factors helps in interpreting whether the latest deliveries data represent a change in direction or only a temporary deviation from an existing trend, and in pinpointing in a more timely way a divergence from previous trends and expectations. This type of analysis also helps to locate potential data problems more rapidly than may otherwise be the case.

It should be noted that the goal is not to forecast future events, but rather to explain recent developments. The potential for shifts in economic growth, petroleum prices, and other market factors all but guarantee that future trends will differ from the recent past.

"Top Down" versus "Bottom Up"

It is possible to analyze consumption trends from the "top down" or from the "bottom up". The "top down" approach assesses the trend in total deliveries without regard for individual products, but in light of such factors as overall economic growth, petroleum price levels, and similar broad measures. The "bottom up" approach analyzes developments for individual products, combining the results into an overall trend.

We have found that the "top-down" approach, though attractive for its simplicity, has its pitfalls. Wide swings for individual products such as residual fuel oil, for example, can obscure trends for the remaining collection of products, or special circumstances that affect only one product may not be fully represented. Thus, we have found it more useful to proceed with a "bottom-up" approach as the primary method. Nevertheless, comparison with a "top-down" approach is a helpful check for consistency and serves as an indicator as to whether important considerations need to be re-examined.

Time Series Approaches

Whether a "top-down" or "bottom-up" approach is taken, there are several useful techniques for analyzing petroleum consumption trends. One group of techniques form the statistical or time-series-oriented approach, essentially manipulating the deliveries data series in an effort to separate short-term and seasonal variations from longer-term trends. Simpler approaches include forms of averaging—by converting the data to quarters or computing moving averages. These smooth out short-term fluctuations in an effort to make longer-term trends more apparent.

A slightly more sophisticated method is to estimate trend lines using regression analysis. Here, we have found that care must be taken that the undue influence of end-points does not mislead—especially because at least one of the end-points, i.e., the most recent month's deliveries, is usually the observation of most critical interest. A trend that is robust with respect to the period chosen is more reliable than one that shifts dramatically with the inclusion or exclusion of a few data points. Also, some series are too noisy or erratic to support a finding of a statistically significant trend—or the resulting degree of precision may be too wide to be particularly meaningful.

This type of analysis is difficult to do with monthly data without some means to account for seasonality. We use one of the most widely-used seasonal adjustment procedures, Census X-11, which estimates the "typical" seasonal pattern of the series based on a number of years worth of data. It can also account for "trading day" effects—that is, if the day of the week has a consistent effect on the level of deliveries, this can be estimated from the monthly data. The X-11 procedure also allows for shifts in seasonal patterns over time, an evident characteristic of deliveries patterns for major petroleum products, and has means for discounting unusual "blips" in the data.

The seasonally-adjusted data make it possible to more easily compare adjacent months and make it more obvious when values are "off trend". For example, seasonally adjusted data help in determining whether, for example, an uncharacteristically large change in the current month's deliveries versus a year ago is the result of unusually high deliveries this year or unusually low deliveries last year—or both. Again, as with any statistical procedure, care should be taken; seasonal adjustment is most meaningful for products with stable seasonal patterns and without wide swings in levels over the most recent years. Thus, seasonal factors for gasoline are likely to be more reliable than for residual fuel oil.

Approaches Involving the "Fundamentals"

These time-series approaches by themselves are not enough; though we have found them to be helpful, they only rearrange the data in ways that make it easier to comprehend what is happening to the series itself. In addition to the time-series approach, it is also vital to analyze the "fundamentals" and alternative indicators of demand in an effort to get beyond the deliveries data and understand what is happening to actual usage.

For example, we estimate the relationship of weather to distillate deliveries from past data via a regression model, taking note of the shifts in the distribution of distillate fuel oil between heating and other uses over the years. Other indicators, such as truck and rail traffic in the case of distillates, or in the case of gasoline, personal income, miles traveled, trends in fleet fuel efficiency, all provide useful insights into consumption patterns and serve as a check on the validity of the deliveries data.

As one illustration of the latter, the kerosine jet fuel deliveries originally reported by the Department of Energy (DOE) in the 1987 *Petroleum Supply Monthly* appeared to be too low when compared with consumption trends as suggested by the growth in air traffic, even allowing for efficiency improvements as newer planes entered the commercial fleet. Subsequently, DOE found that imports, and thus deliveries, had been under-counted. Once DOE revised its data, the growth in kerosine jet fuel deliveries came much closer to the indicated growth in consumption, confirming that the estimated consumption trend was providing information that the deliveries data had not.

Awareness of a special development for a particular fuel also helps in determining whether a particular month's deliveries data represents a significant change in consumption patterns or only an aberration. For example, the surge in distillate deliveries this past March and the subsequent flaccid results for April are put into perspective when the change in diesel tax collection procedures that took effect April 1 is taken into account. Looking at seasonally- and weather-adjusted data, as discussed above, made the gyrations of distillate deliveries during that period even more apparent, and combined with the information on tax procedures, helped to show that this was related more to short-term nonprimary stock movements than to shifts in consumption.

When time-series and "fundamentals" approaches yield differing results, it is a sign that further analysis is needed as to whether the discrepancy arises from inappropriate assumptions or techniques, problems with the deliveries data, movements in nonprimary stocks, or other factors.

In conclusion, we believe the estimation of underlying trends in petroleum consumption is necessary in order to better interpret current developments in the light of available information. But the caveat is that this information is incomplete—assumptions need to be made, and novel situations may not necessarily conform to relationships based on historical experience. This means that conclusions drawn at one point may later turn out to be inaccurate, and that conclusions about trends that were seemingly apparent earlier must be modified in the light of new information. Nevertheless, we believe that the underlying trends are in many ways of much greater importance than the peculiarities that shape a single month's deliveries.